REMARKS

In the International phase of this PCT application amended sheets (1-4, 11 and 12) have been filed. Amended sheets 1 to 4 affect the specification, amended sheets 11 and 12 affect the claims. The claims amended in the International phase are regarded in the present Preliminary Amendment. Amended sheets 1 to 4 affecting the specification replace original sheets 1 to 4 of the International application.

Claims 1–7 have been cancelled and new claims 8-20 have been added. Thus, claims 8-20 are presented for examination. Applicant respectfully requests allowance of the present application in view of the foregoing amendments.

Conclusion

The commissioner is hereby authorized to charge any appropriate fees due in connection with this paper, including the fees specified in 37 C.F.R. §§ 1.16 (c), 1.17(a)(1) and 1.20(d), or credit any overpayments to Deposit Account No. 19-2179.

Respectfully submitted,

Dated: 10/31/13

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Description

Heat shield arrangement for a hot-gas conducting component, in particular for structural parts of gas turbines, and method for production of said arrangement

The invention relates to a heat shield arrangement for a hot-gas conducting component, in particular for structural parts of gas turbines. It further relates to a method for producing said arrangement.

The arrangement contains a plurality of heat shield elements disposed adjacently on a support structure and anchored to this to cover a surface, and wherein at least two adjacent heat shield elements each have at least one lateral groove, arranged in the region of the edge of the surface thereof facing the hot gas, these heat shield elements being connected by means of at least one seal element installed in the groove. An arrangement of this type is known, for example, from EP 1 022 437 A1 or from EP 0 896 128 A2.

The high temperatures prevailing in hot-gas chambers necessitate protecting a support structure exposed to hot gas. This can be done, for example, by lining the hot-gas chamber with heat shield elements whose surface facing the hot gas is cooled.

EP 0 224 817 B1 describes a heat shield arrangement, in particular for structural parts of gas turbine units, which is formed from a number of triangular heat shield elements. The heat shield elements are arranged adjacently, with a gap being left in each case, on a support structure and screwed to said structure.

A disadvantage of this is that hot gas from the combustion chamber can pass through the above-mentioned gaps and make contact with the support structure with the result that the material of

the support structure can be damaged by the resulting massive heat impact.

The German patent application with the application file number 100 03 728.3 discloses a heat shield arrangement consisting of a number of heat shield elements wherein seal elements, preferably checker plates, are installed between the heat shield elements to prevent the escape of hot gas from the combustion chamber and thus protect the support structure.

A disadvantage of said arrangement is, for example, that a heat shield element with this type of arrangement cannot be installed or released independently of its adjacent heat shield elements. If, for instance, only the anchorage of one heat shield element were released when said arrangement was being released, for repair purposes for example, and an attempt then made to remove the heat shield element, such an attempt would fail because the seal elements belonging to the adjacent heat shield elements would at least have to be removed manually before the heat shield element could be withdrawn from the arrangement which, however, is not possible without releasing the adjacent heat shield elements from the support structure or at least loosening their anchorage and displacing them to an eccentric position with the result that the gap between the heat shield elements is enlarged.

Also during the production of this type of arrangement the heat shield elements cannot simply be anchored to the support structure independently of each other; instead, a relatively large gap must first be formed between the heat shield elements in each case, the seal element then installed, the gap then reduced in size, and the heat shield elements finally anchored to the support structure.

The object of the invention is accordingly to disclose a heat shield arrangement for a hot-gas conducting structure, in par-

ticular a metal component of a gas turbine unit or combustion chamber, with heat shield elements anchored adjacently on a support structure to cover a surface, and a method for producing said type of heat shield arrangement which in particular overcomes the described disadvantages, is flexible in its application, and can be produced particularly easily and quickly.

As regards the arrangement, the object is achieved according to the invention in that the seal element and the grooves are contoured and dimensioned in such a way that the seal element can be swiveled in the grooves during a movement of a heat shield element vertically with respect to its surface facing the hot gas.

With a heat shield arrangement according to the invention, on the one hand the support structure is protected from making contact with hot gas escaping from the combustion chamber by means of the seal element which closes gaps between the heat shield elements of the heat shield arrangement. On the other hand, a heat shield arrangement according to the invention is easy to produce and release on account of the particular embodiment of the seal element as a sealing flap because, on being installed or released, the seal element can be displaced from a first to a second position or vice versa so that when the arrangement according to the invention is produced the seal element is automatically displaced from its first (open) position to its second (closed) position and, on being released, the arrangement according to the invention is automatically displaced from its second to its first position. This means it is not necessary to manually displace the seal to its second (closed) position or remove it from its second position. It is possible, moreover, to remove a single heat shield element without having to release the anchorages of adjacent heat shield elements.

the seal element (30) can be retained in an open position without a sealing effect as a consequence of the longitudinal slot (61) embodied through the C-shaped cross-section.

6. Method for producing a heat shield arrangement according to one of the Claims 1 to 5
comprising the following steps:

a) a first and a second heat shield element (51, 52) are anchored on the support structure (45) leaving a space for a third heat shield element (53) so that the groove (55) of the first heat shield element (51) is situated opposite the groove (55) of the second heat shield element (52),
b) a seal element (60) is in each case installed in the groove (55) of the first and of the second heat shield element (51, 52) in such a way that the seal element (60) is retained in the first position,
c) the third heat shield element (53), having in each case a groove (55) on opposite sides, is moved into the space in the direction of the support structure (45) with a seal element (60) in each case protruding into one of these grooves (55),
d) the seal element (60) is displaced in each case into the second position due to the movement (B) of the third heat shield element (53), and
e) the third heat shield element (53) is anchored on the support structure (45).

Practically the entire area of a hot-gas chamber exposed to the hot gas can be covered by means of such seal elements between, in each case, two adjacent heat shield elements. It must be said, however, that special designs may be necessary at particular locations (such as at the location of measuring equipment and inward or outward ducts for gasses in the hot-gas chamber etc.), although the invention is suitable for sealing at least the majority of the heat shield elements in the arrangement from each other by means of such flaps.

A separate operating step is not required to put the seal elements into the arrangement according to the invention when the arrangement according to the invention is produced; instead, the seal elements move automatically into their second (closed) position as the result of the movement of a heat shield element which is to be used, without the need to release the anchorages of adjacent heat shield elements on the support structure.

The seal element advantageously has an essentially C-shaped cross-section. A seal element cross-section of this type is especially suitable as the (longitudinal) slot formed in this way can be employed with particular facility for retaining the seal element in the first position by, for example, attaching the slot of the seal element to the wall of a groove and so retaining it in the first position.

In an advantageous embodiment of the invention the seal element is designed as a bent plate. The seal element is particularly easy to produce if produced by bending a plate, as a very large number of raw materials are available in plate form.

Claims

1. Heat shield arrangement (5) for a hot-gas conducting structure, in particular a metal component of a gas turbine unit or combustion chamber (10), with shield elements (20) arranged adjacently on a support structure (15) and anchored to this to cover a surface
wherein
at least two adjacent heat shield elements (20) have in each case at least one lateral groove (25), arranged in the region of the edge of the surface thereof facing the hot gas,
these heat shield elements (20) are connected by means of at least one seal element (30) installed in the groove (25), and
wherein
the seal element (30) and the grooves (25) are contoured and dimensioned in such a way that the seal element (30) can be swiveled in the grooves during a movement of a heat shield element (20) vertically with respect to its surface facing the hot gas.

2. Heat shield arrangement according to Claim 1
wherein
the seal element (30) has an essentially C-shaped cross-section.

3. Heat shield arrangement according to Claim 1 or 2
wherein
the seal element (30) is embodied as a bent plate.

4. Heat shield arrangement according to Claim 3
wherein
the plate consists of sheet metal.

5. Heat shield arrangement according to one of the Claims 2 to 4
wherein

1/2

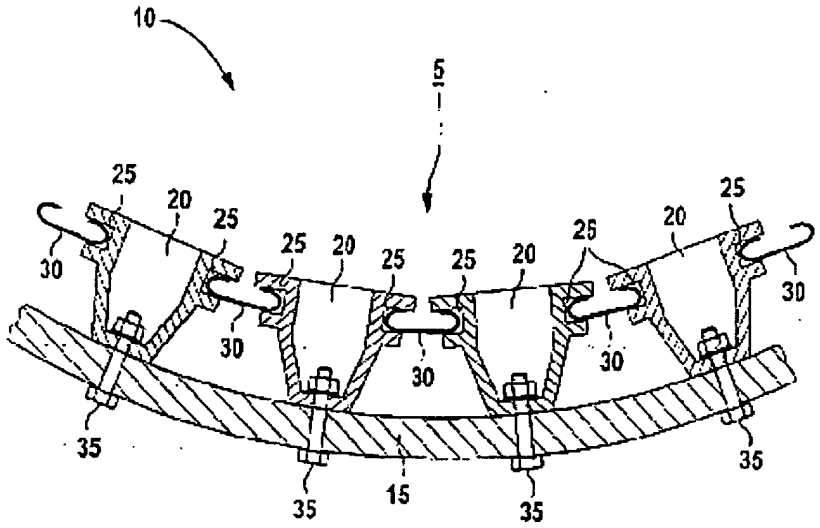

FIG 1

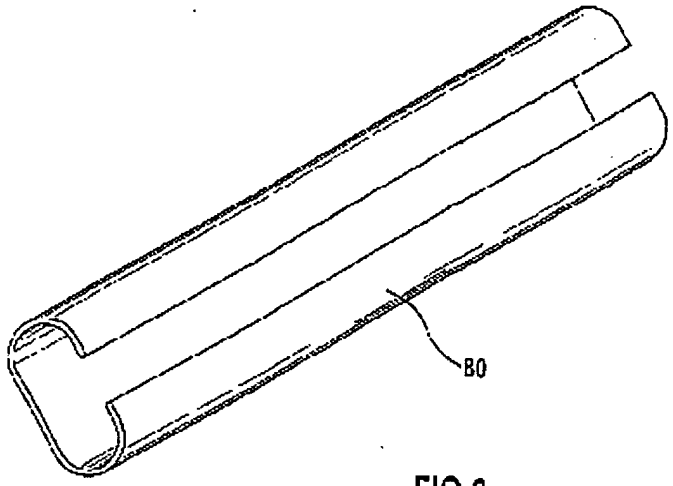

FIG 3

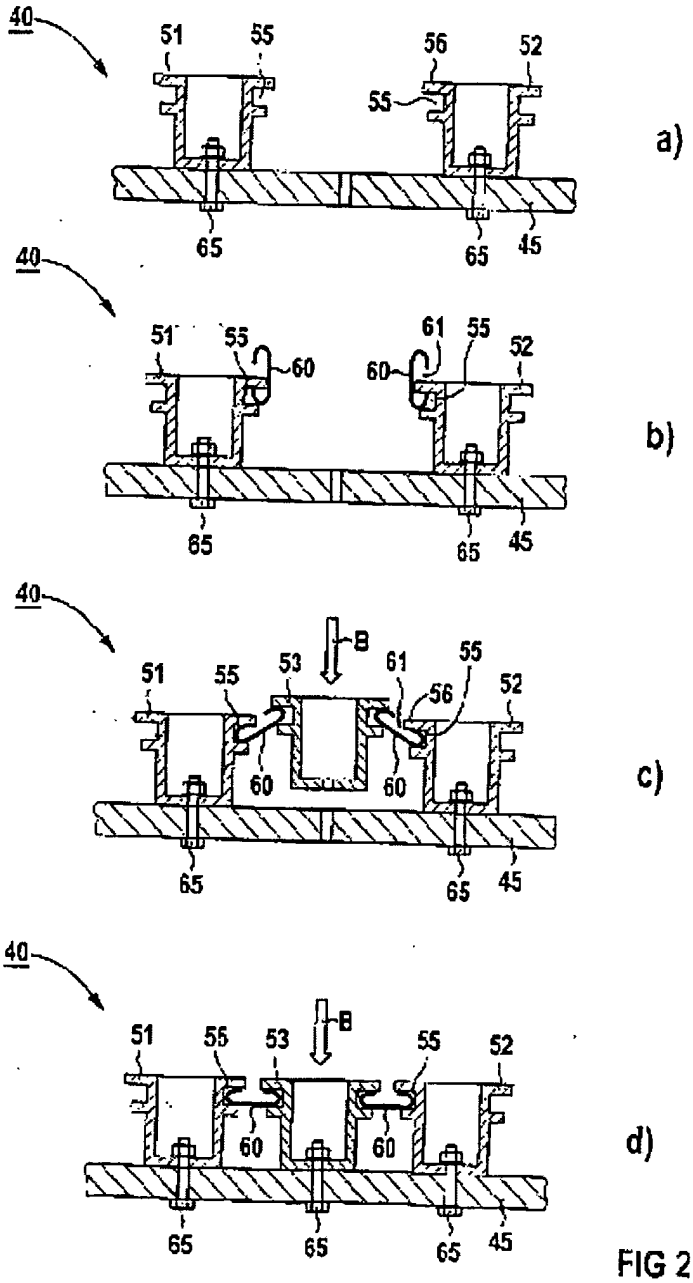
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FIG 2